

# PBB B-MAC architecture alternatives

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# Introduction

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Analysis of B-MAC architecture alternatives (open minded)

802.1ah D3.5 specifies one of the alternatives; the most complex one

- ❑ MAC encapsulation in the I-Component
- ❑ World-wide B-MAC scope, instead of per PBBN B-MAC scope
- ❑ More B-MACs within one PBBN than necessary
- ❑ Enforcing ISID-based group B-MAC address translation in CBPs
- ❑ Enforcing the use of NCA bit in the 802.1ah frame format

Other alternatives limit B-MAC scope to single PBBN

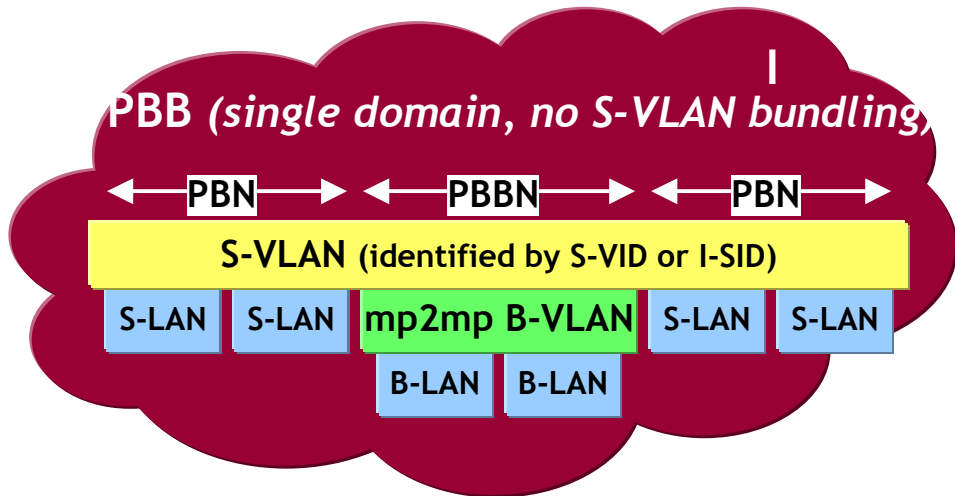
- ❑ MAC encapsulation in CBP
- ❑ Minimal number of B-MACs within one PBBN
- ❑ No ISID-based group B-MAC address translation
- ❑ No need for NCA bit

# B-MAC architecture alternatives

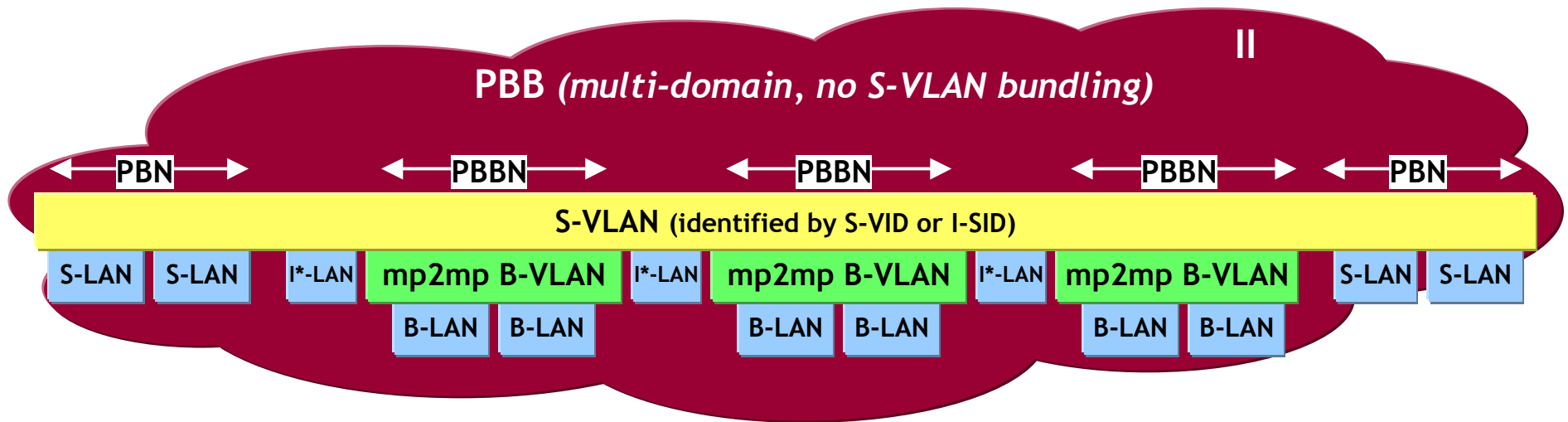
	<b>PBBN Domains</b>	<b>S-VLAN bundling</b>	<b>Trunk type</b>	<b>B-MAC scope</b>	<b>B-DA translation</b>	<b>Note</b>
Model I	single	no	mp2mp	B-VLAN	no	
Model II	multiple	no	mp2mp	B-VLAN	no	
Model IIIa	single	yes	mp2mp	B-VLAN	no	
Model IIIb	single	yes	mp2mp	I-SI	no	
Model IVa	multiple	yes	mp2mp	B-VLAN	no	minimal complexity
Model IVb	multiple	yes	mp2mp	I-SI	yes	p802.1ah D3.5
Model IVc	multiple	yes	mp2mp	I-SI, B-VLAN	no	comment #188
Model V	multiple	yes	p2p	I-SI	no	support by additional technology
Model IVb/V	multiple	yes	mix	I-SI	yes/no	interworking

# Layer stack alternatives

No S-VLAN bundling, single & multi domain PBBN

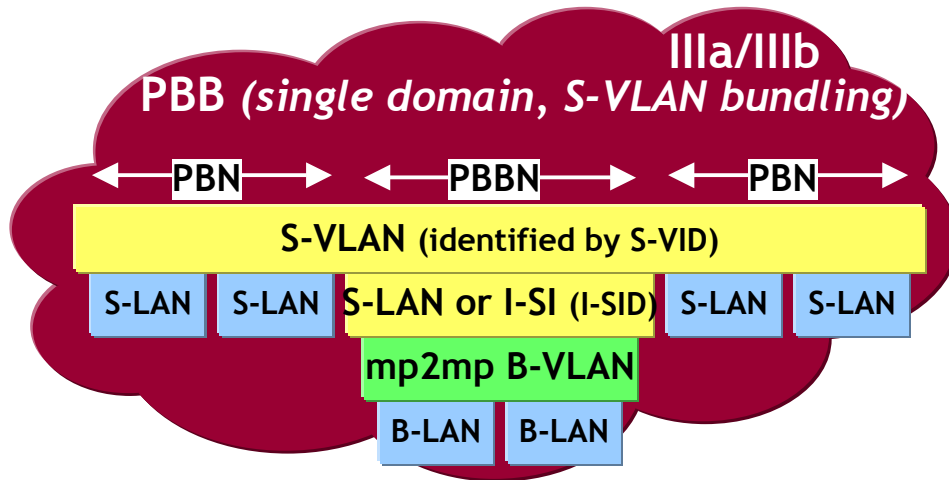


Bridging is performed in S-VLAN layer within PBN domains, and in B-VLAN layer outside PBN domains

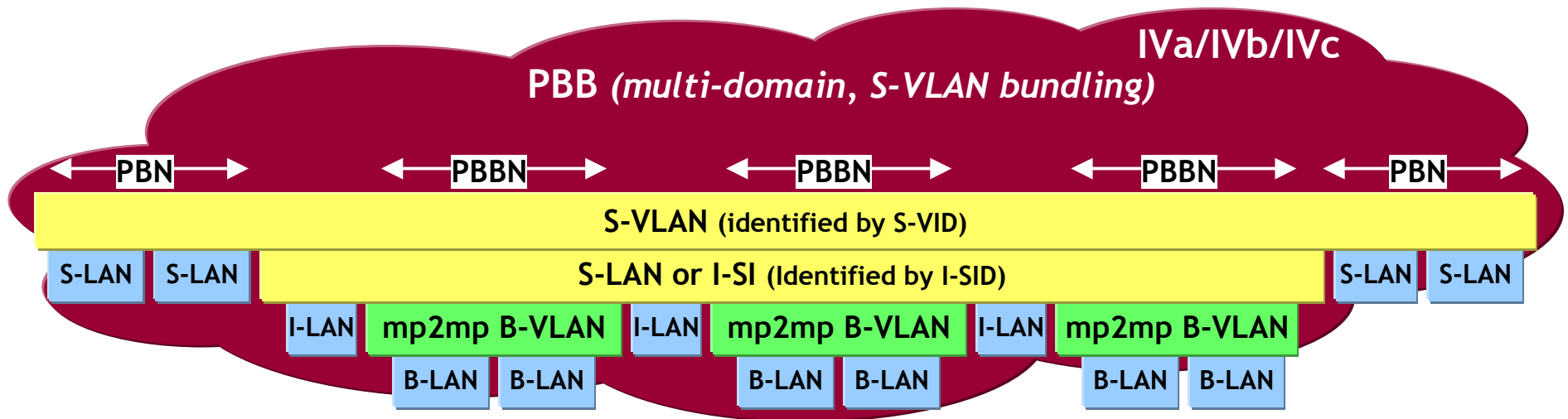


# Layer stack alternatives

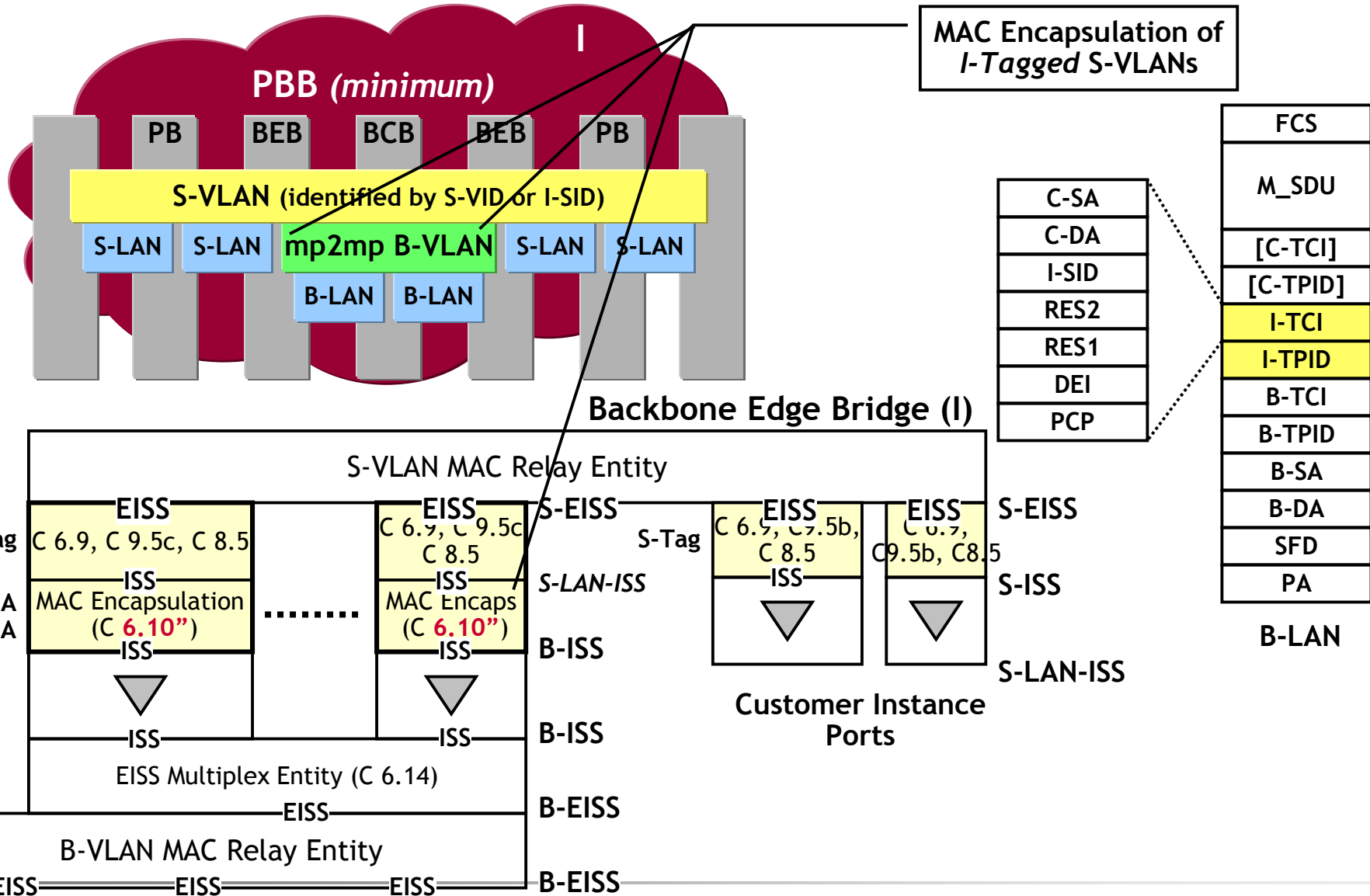
*S-VLAN bundling, single & multi domain PBBN*



Bridging is performed in S-VLAN layer within PBN domains, and in B-VLAN layer outside PBN domains

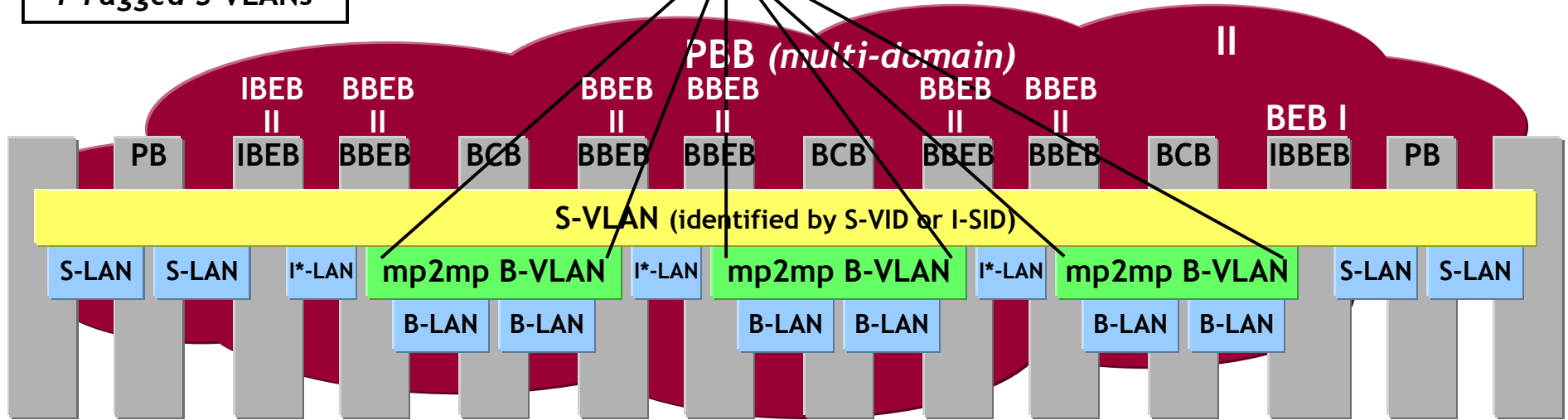


# MAC Encapsulation (I)

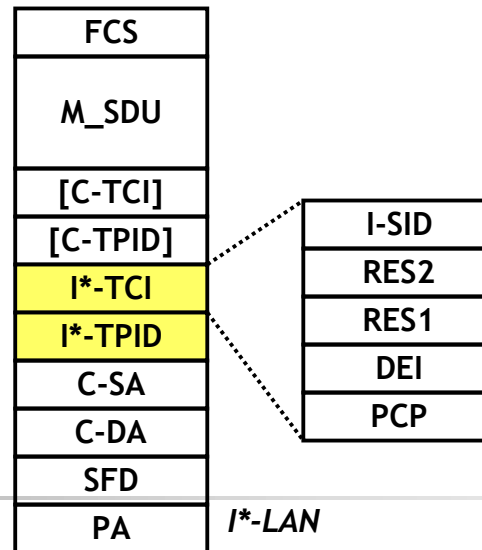
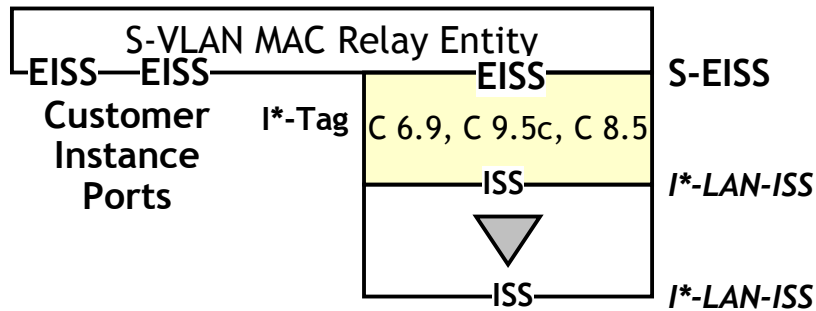


# MAC encapsulation (II)

MAC Encapsulation of I-Tagged S-VLANs

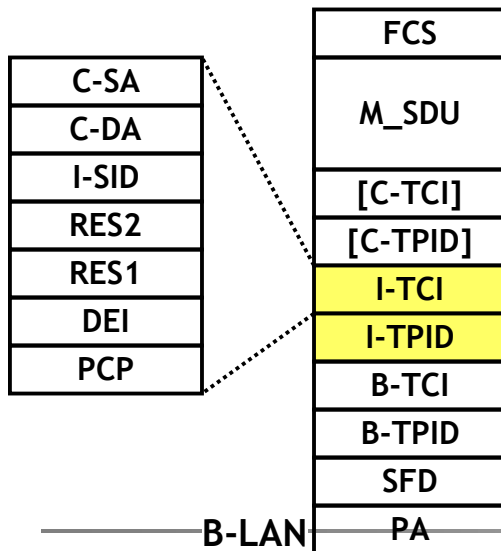
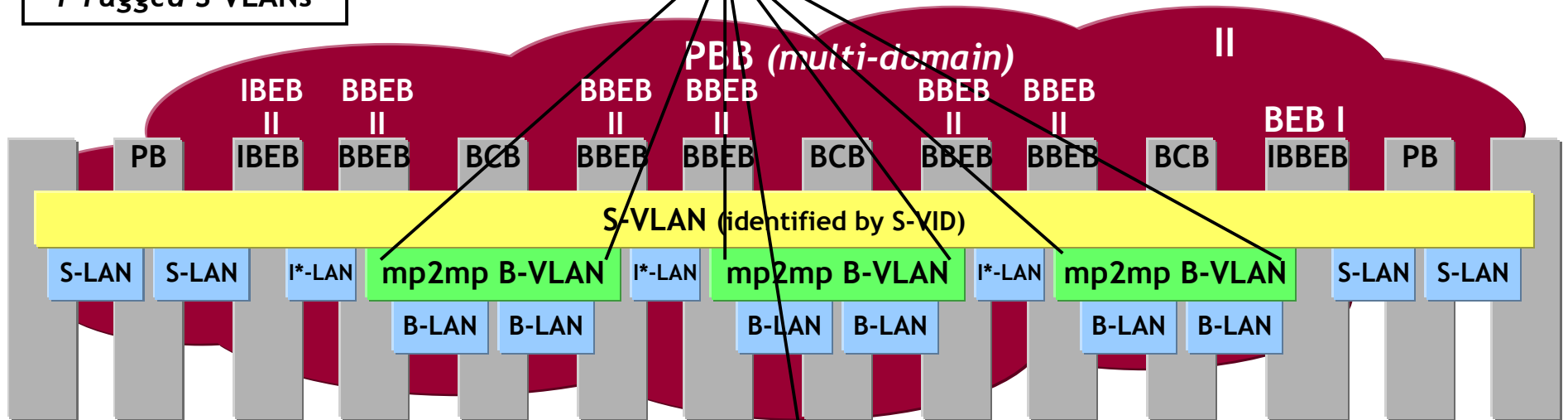


## I-Component Backbone Edge Bridge (II)

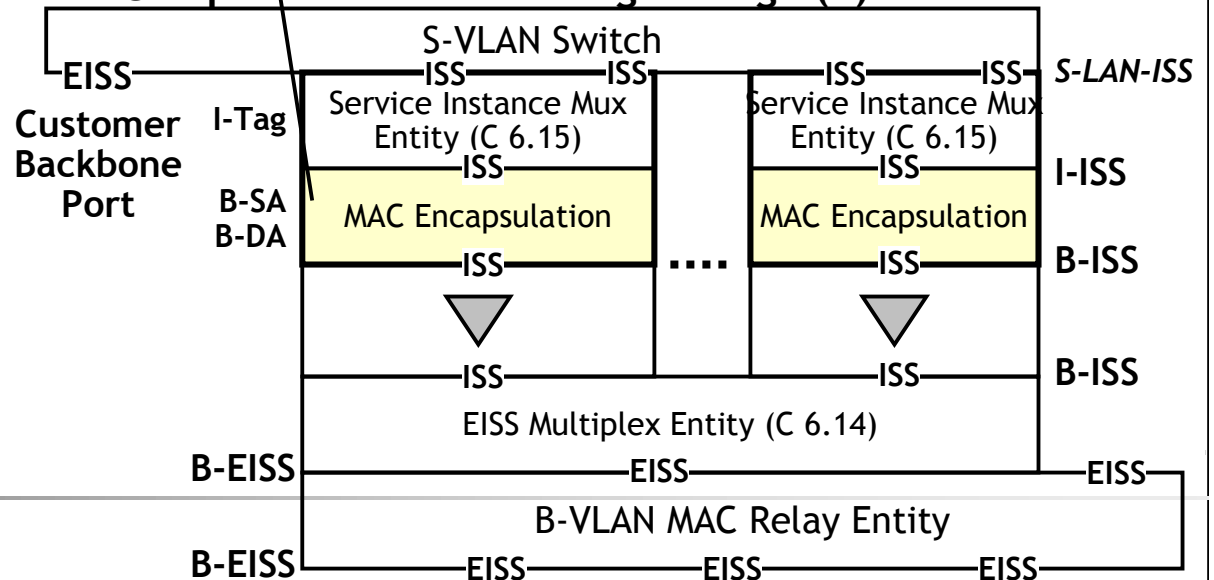


# MAC encapsulation (II)

MAC Encapsulation of I-Tagged S-VLANs

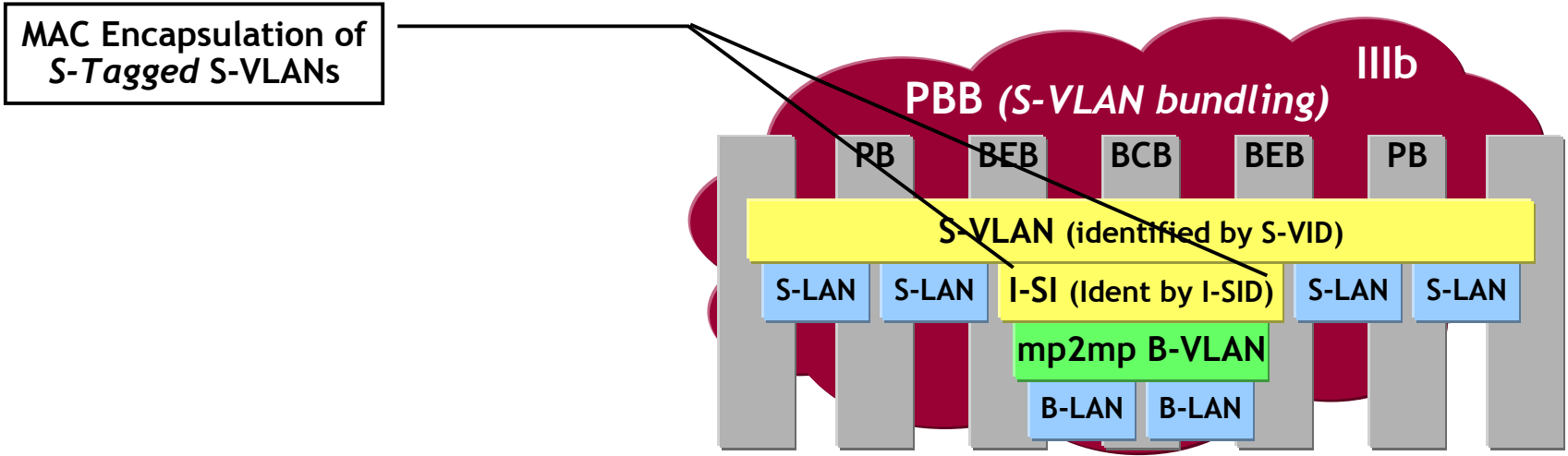
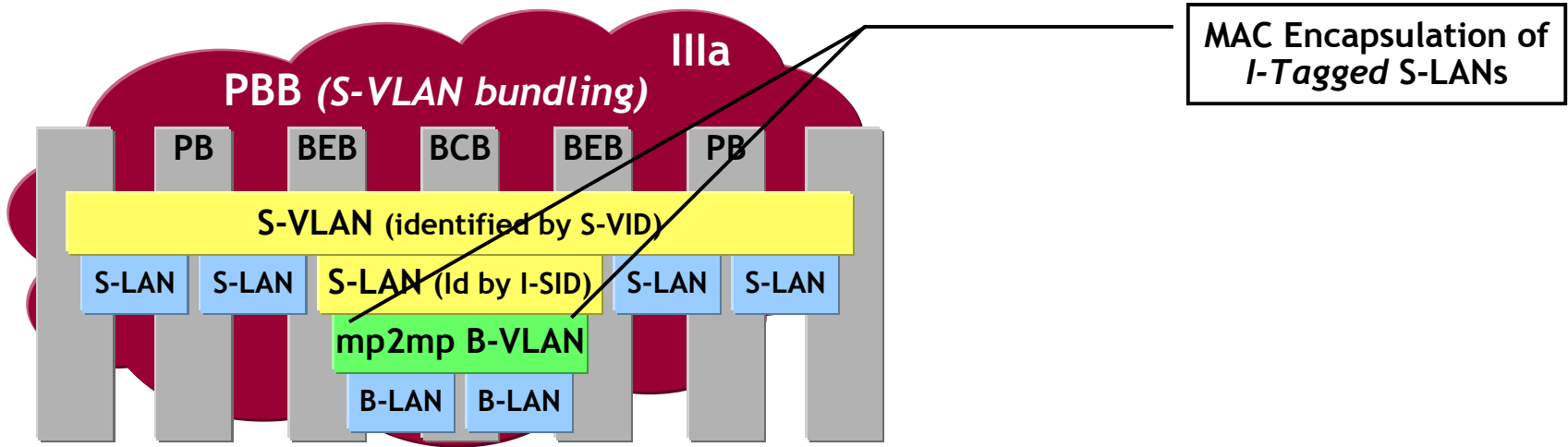


## B-Component Backbone Edge Bridge (II)

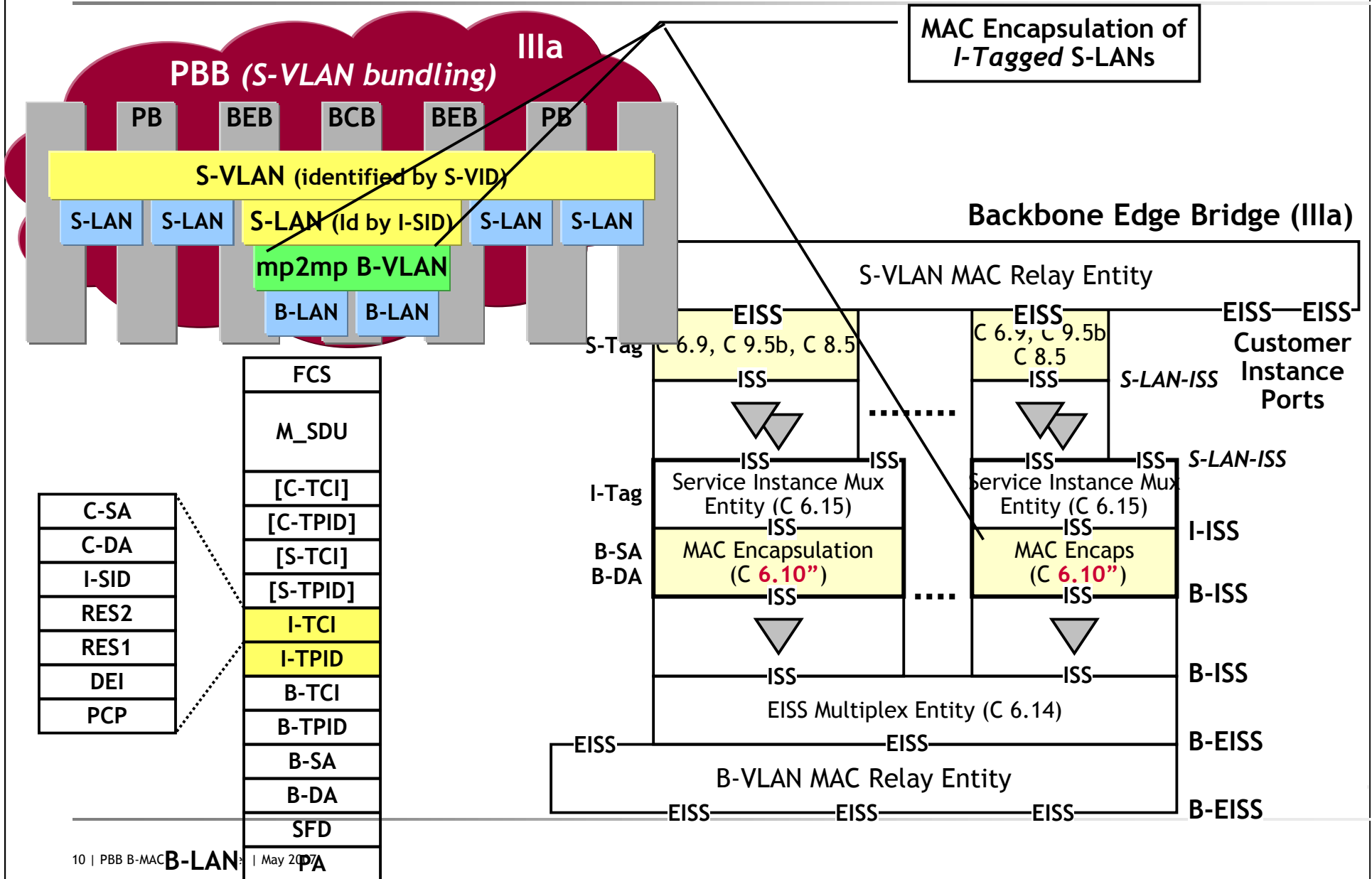




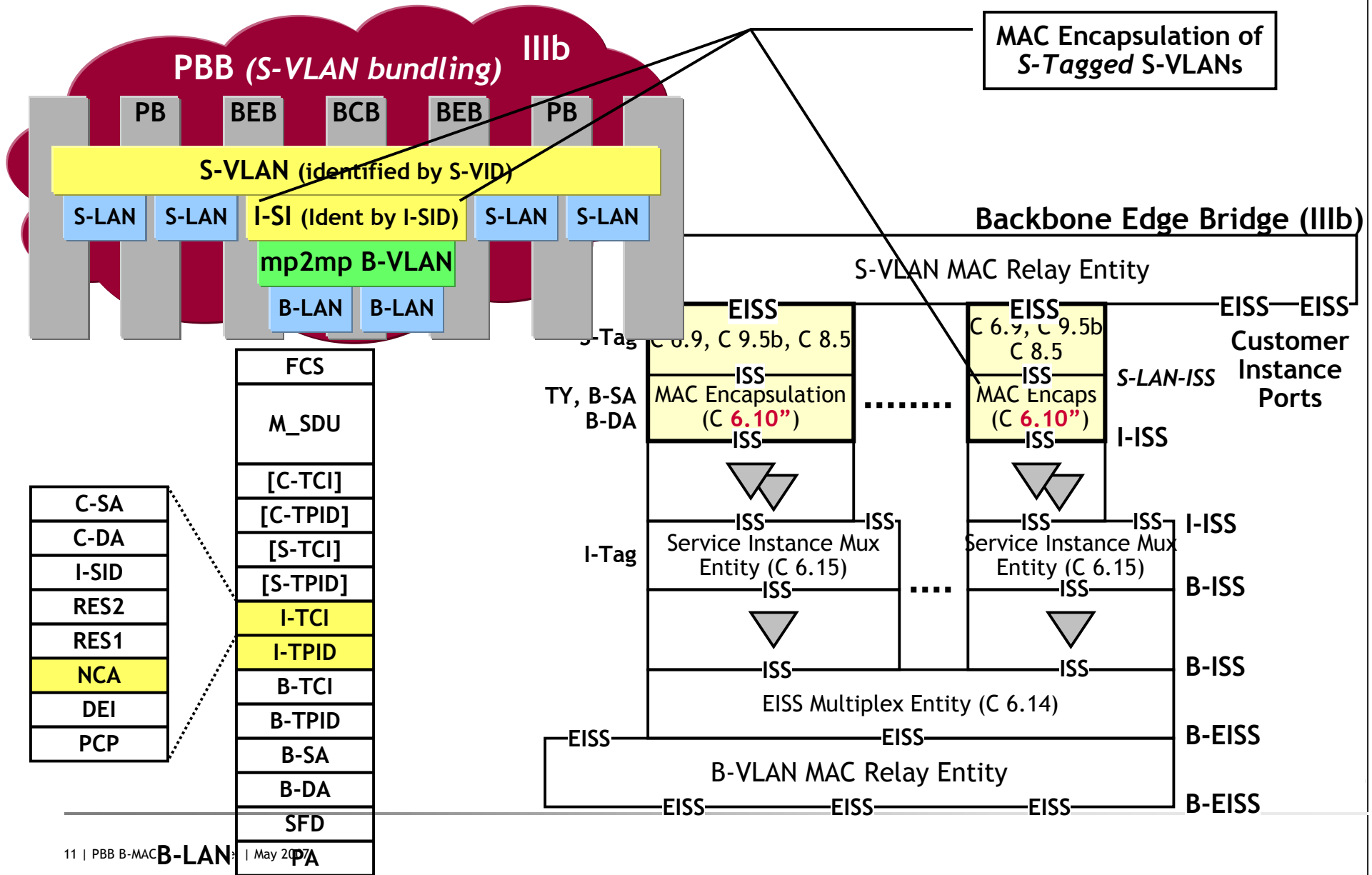
# MAC Encapsulation (IIIa, IIIb)



# MAC Encapsulation (Illa)



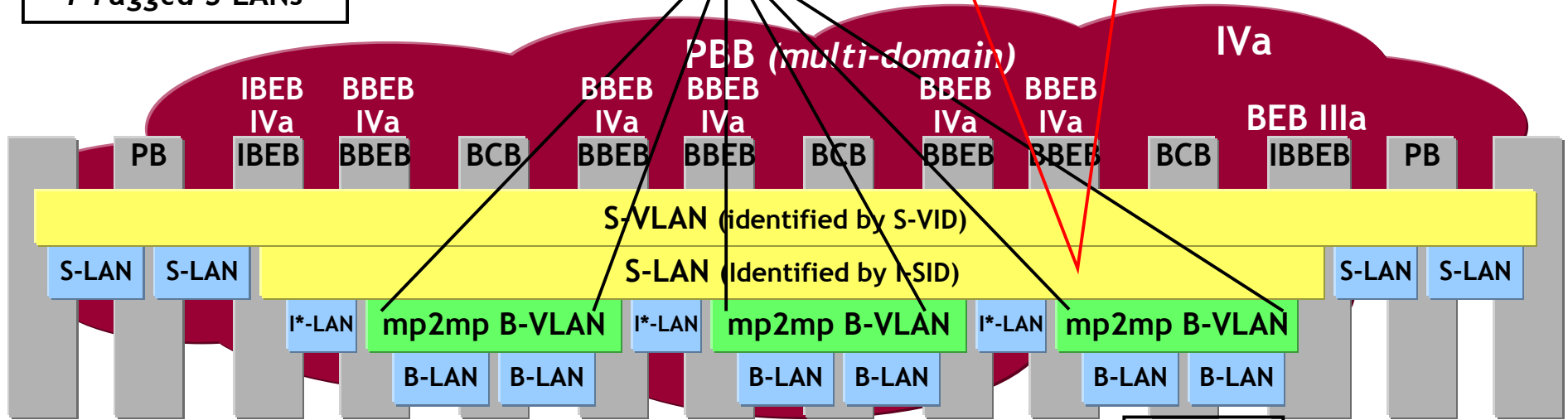
# MAC Encapsulation (IIIb)



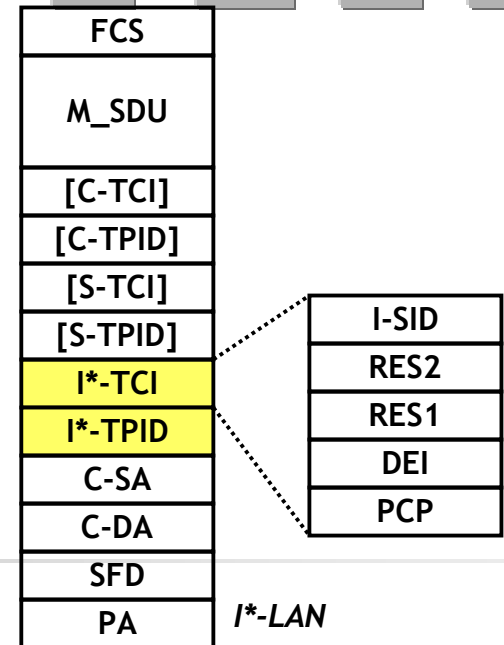
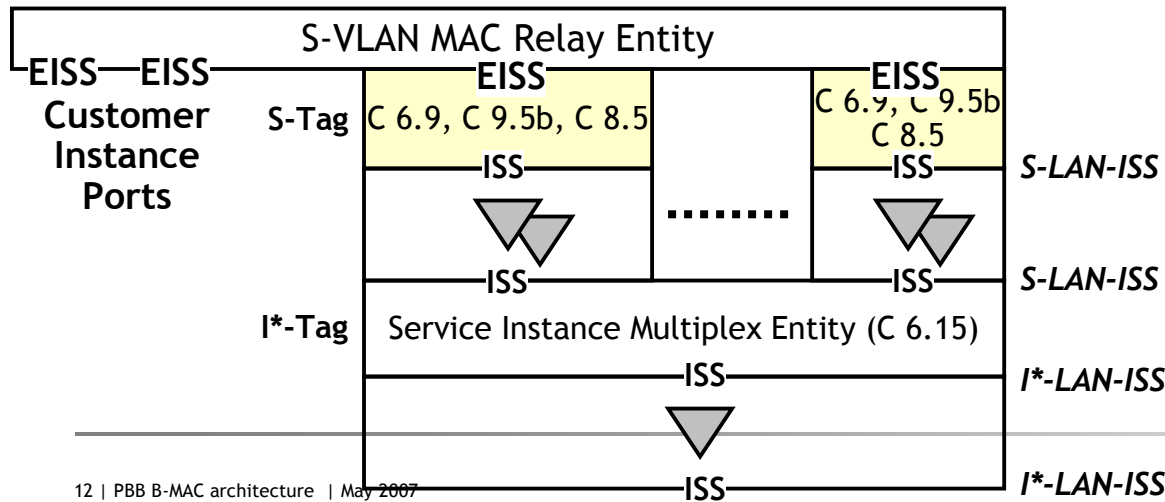
# MAC encapsulation (IVa)

MAC Encapsulation of I-Tagged S-LANs

No bridging in this layer => this layer does not have a specific MAC address requirement



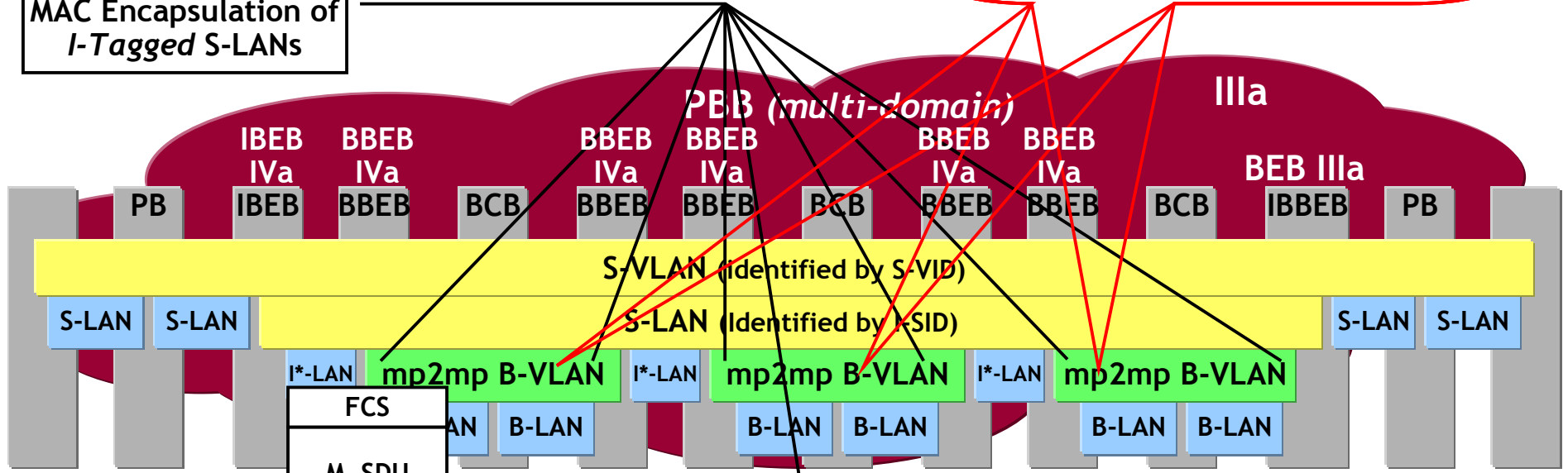
## I-Component Backbone Edge Bridge (IVa)



# MAC encapsulation (IVa)

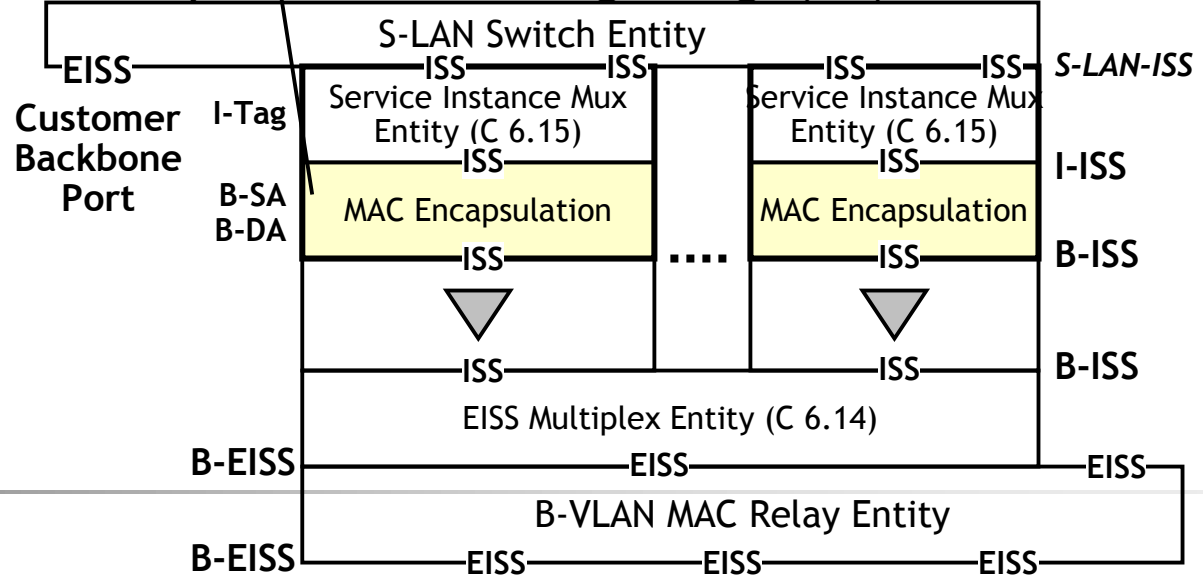
MAC Encapsulation of I-Tagged S-LANs

Bridging in this layer ⇒ this layer requires MAC address scalability



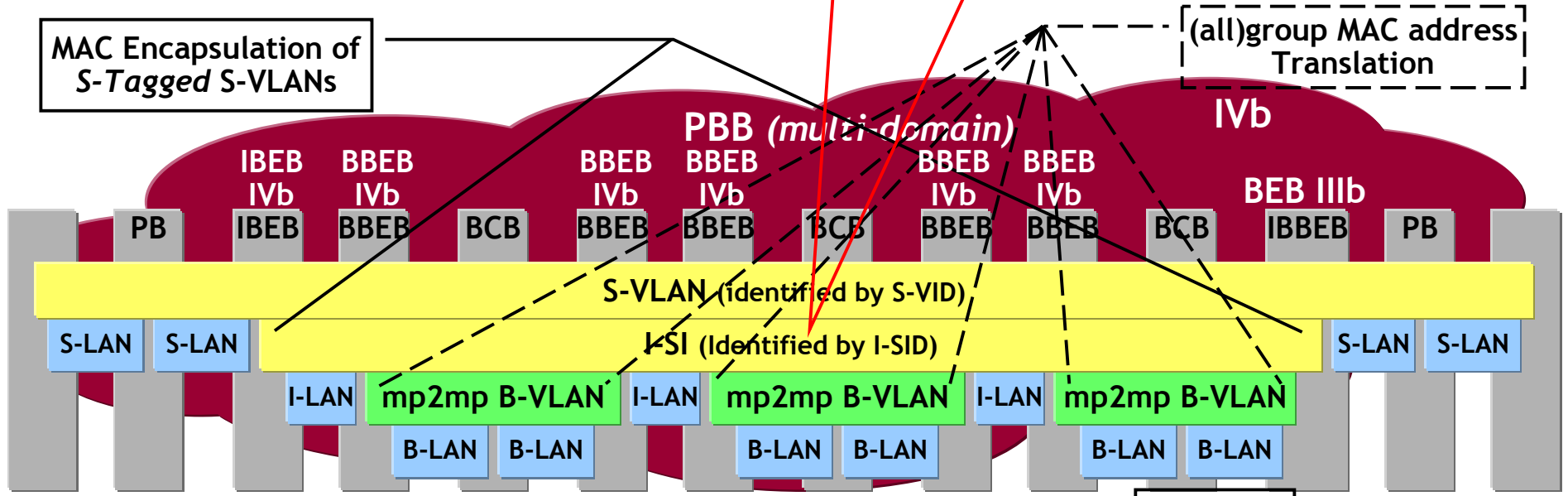
C-SA	[C-TCI]
C-DA	[C-TPID]
I-SID	[S-TCI]
RES2	[S-TPID]
RES1	I-TCI
DEI	I-TPID
PCP	B-TCI
	B-TPID
	B-SA
	B-DA
	SFD
	B-LAN PA

## B-Component Backbone Edge Bridge (IVa)

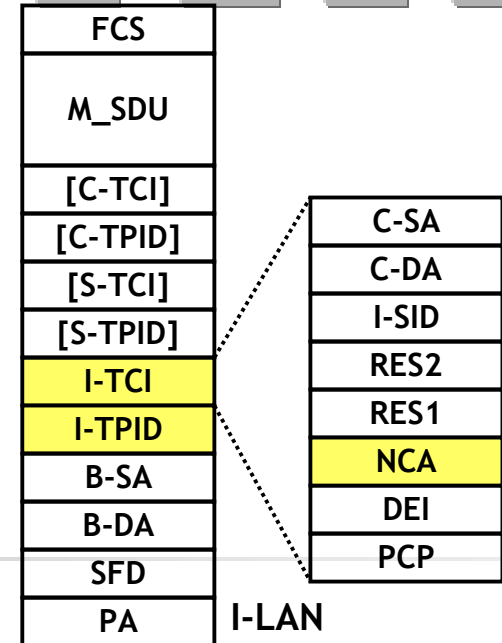
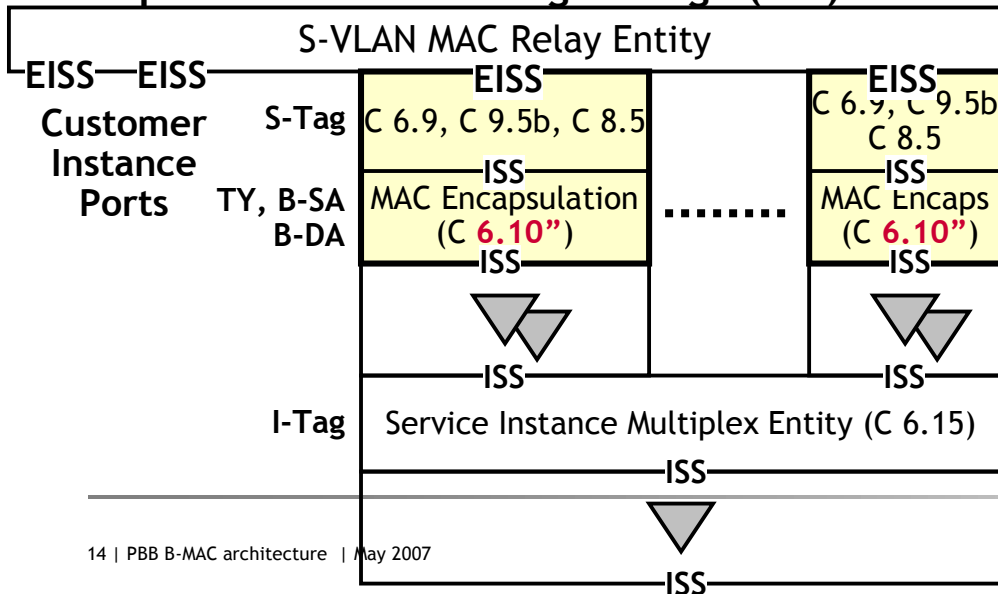


# MAC encapsulation (IVb)

No bridging in this layer



## I-Component Backbone Edge Bridge (IVb)

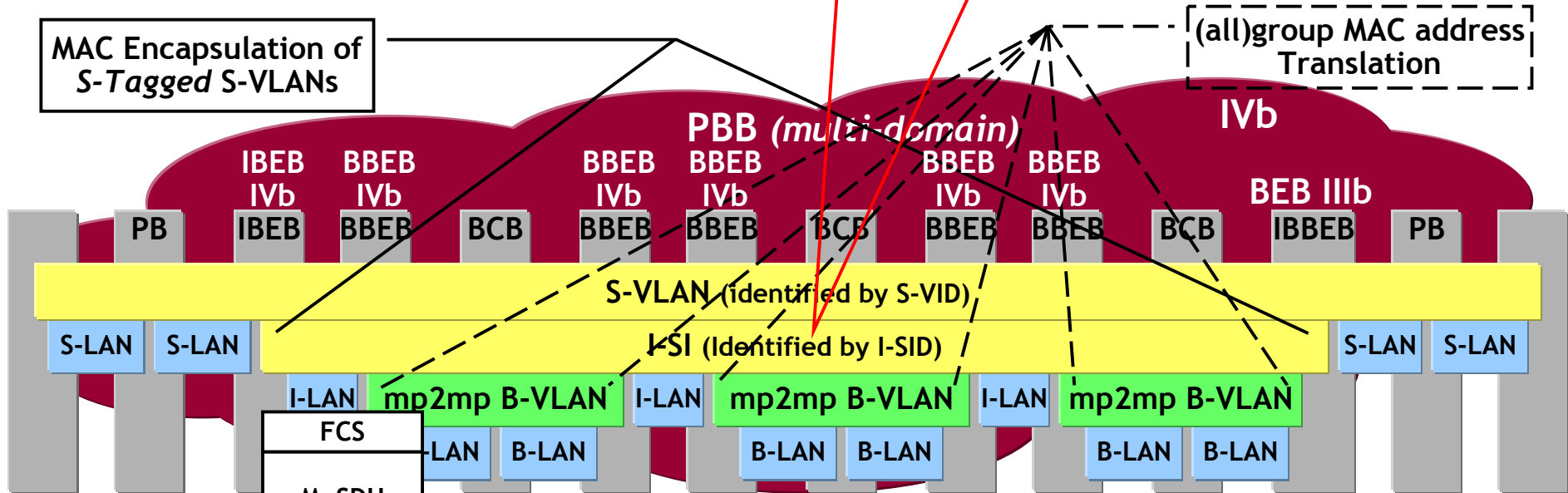


# MAC encapsulation (IVb)

No bridging in this layer

MAC Encapsulation of S-Tagged S-VLANs

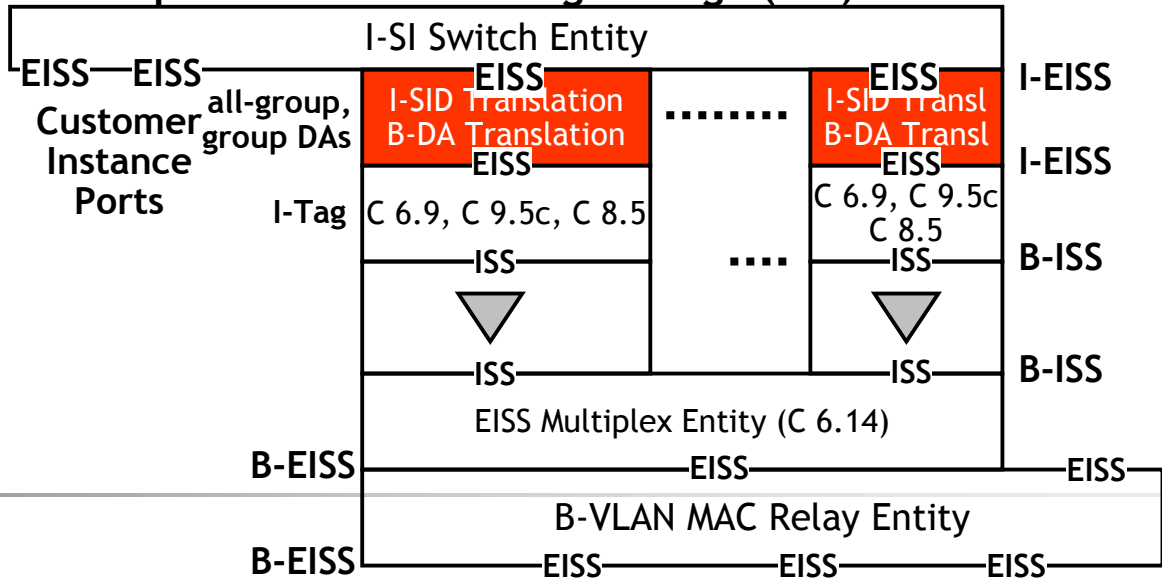
(all)group MAC address Translation



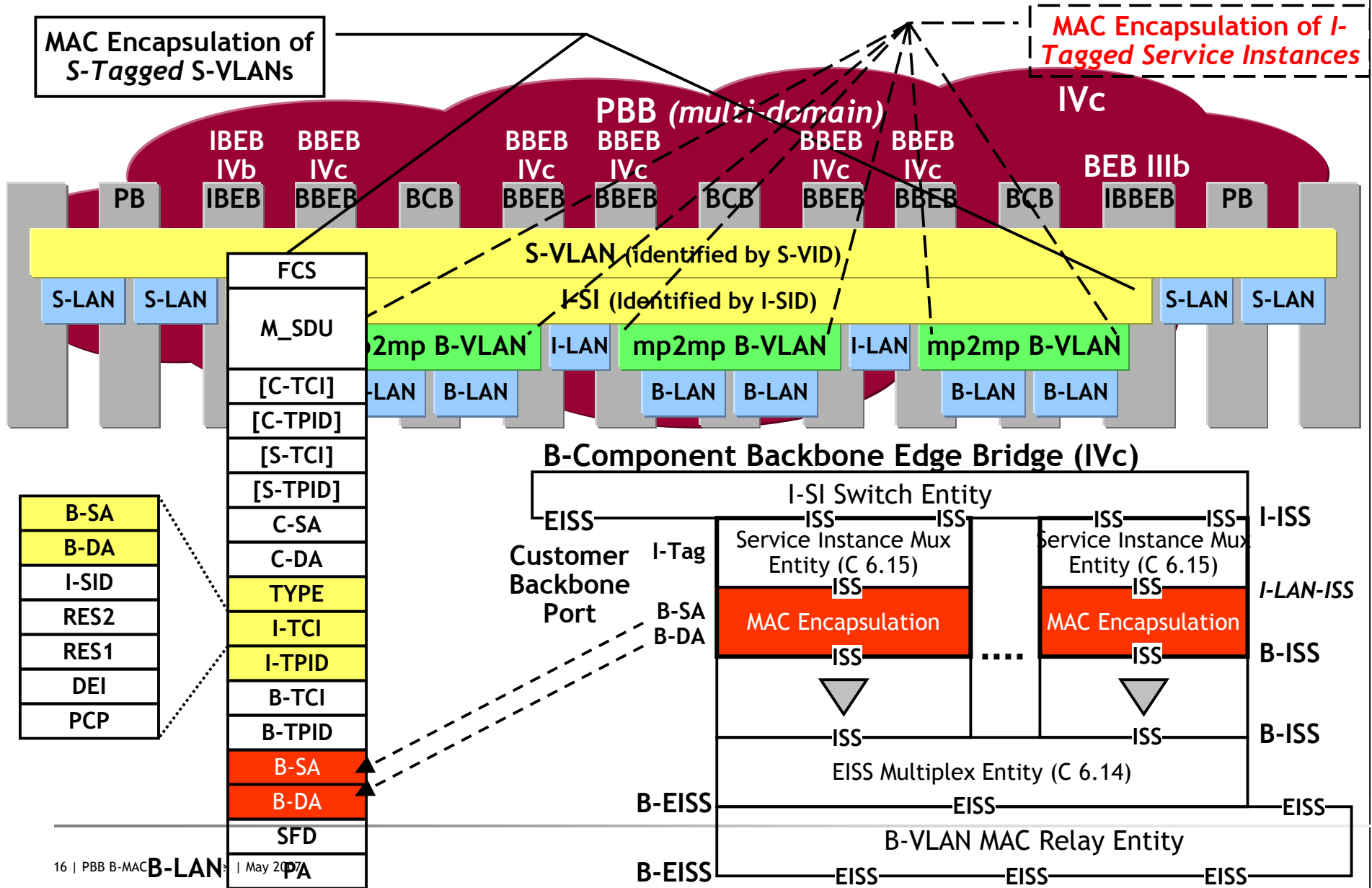
C-SA
C-DA
I-SID
RES2
RES1
NCA
DEI
PCP

FCS
M_SDU
[C-TCI]
[C-TPID]
[S-TCI]
[S-TPID]
I-TCI
I-TPID
B-TCI
B-TPID
B-SA
B-DA
SFD

## B-Component Backbone Edge Bridge (IVb)



# MAC encapsulation (IVc)





# MAC encapsulation (IVb) - 802.1ah D3.5

## I-BEB (VIP)

- ❑ B-DA is  $f(\text{C-DA}, \text{VID})$ 
  - if C-DA is known unicast then B-DA is associated B-MAC address
  - if C-DA is unknown unicast then B-DA is ISID-group address
  - if C-DA is known multicast then B-DA is associated B-MAC address
  - if C-DA is unknown multicast then B-DA is ISID-group address
  - if C-DA is broadcast then B-DA is ISID-group address
- ❑ C-MAC/VID  $\leftrightarrow$  B-MAC association
  - learn C-SA/VID  $\leftrightarrow$  B-SA relationship
  - configure group C-MAC/VID  $\leftrightarrow$  group B-MAC relationship
- ❑ I-SI related multicast CFM frames
  - B-DA is ISID-group address
- ❑ **2-port I-SI: special treatment?**
  - **B-DA is individual address of destination VIP?**
  - **CFM is then not able to detect a cross connect condition!!**

## B-BEB (CBP)

- ❑ I-SID Translation
- ❑ B-DA Translation (I-LAN to PBBN)
  - if B-DA is ISID-group address then replace B-DA with  $\langle 802.1ah.\text{Backbone-ISID} \rangle$
- ❑ B-DA Translation (PBBN to I-LAN)
  - if  $\text{B-DA} == \langle 802.1ah.\text{ISID} \rangle$  then replace B-DA with  $\langle 802.1ah.\text{Port-ISID} \rangle$

## B-BEB (MAC Relay)

- ❑ Register  $\langle 802.1ah.\text{Backbone-ISID} \rangle$  values

## BCB (MAC Relay)

- ❑ Register  $\langle 802.1ah.\text{Backbone-ISID} \rangle$  values

# MAC encapsulation (IVb) - Interoperability optimized

## I-BEB (VIP)

- ❑ B-DA is f(C-DA, VID)
  - if C-DA is known unicast then B-DA is associated B-MAC address
  - if C-DA is unknown unicast then B-DA is all-group address
  - if C-DA is known multicast then B-DA is associated B-MAC address
  - if C-DA is unknown multicast then B-DA is all-group address
  - if C-DA is broadcast then B-DA is all-group address
- ❑ C-MAC/VID ⇔ B-MAC association
  - learn C-SA/VID ⇔ B-SA relationship
  - configure group C-MAC/VID ⇔ group B-MAC relationship

## B-BEB (CBP)

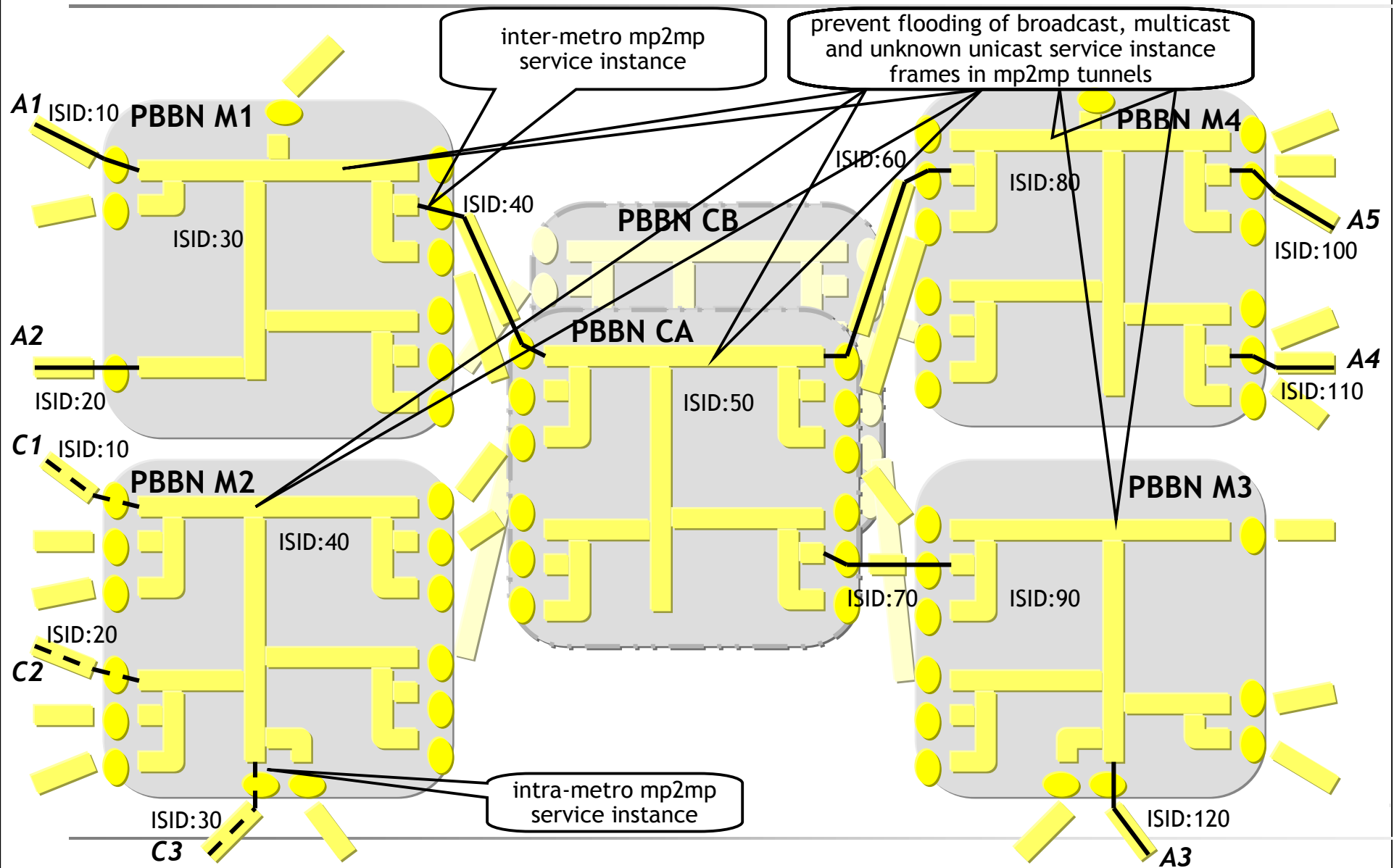
- ❑ I-SID Translation
- ❑ B-DA Translation (I-LAN to PBBN)
  - if B-DA is all-group address then replace B-DA with <802.1ah.ISID>
  - if B-DA is CFM-group address then replace B-DA with <802.1ah.ISID>
- ❑ B-DA Translation (PBBN to I-LAN)
  - if B-DA==<802.1ah.ISID> and MSDU.TYPE<>0x8902 then replace B-DA with all-group address
  - if B-DA==<802.1ah.ISID> and MSDU.TYPE==0x8902 then replace B-DA with CFM-group address with LSB=MEL
- ❑ **2 ports on this PBBN**
  - **use of individual address (e.g. destination-CBP or destination-VIP) causes issues to revert the translation at the destination CBP**
  - **if B-DA==CBP MAC address and → becomes too difficult, as too many fields are to be checked, and sometimes it is not possible to distinguish regular unicast (OAM) frame from a modified broadcast (OAM) frame**

**Backup**

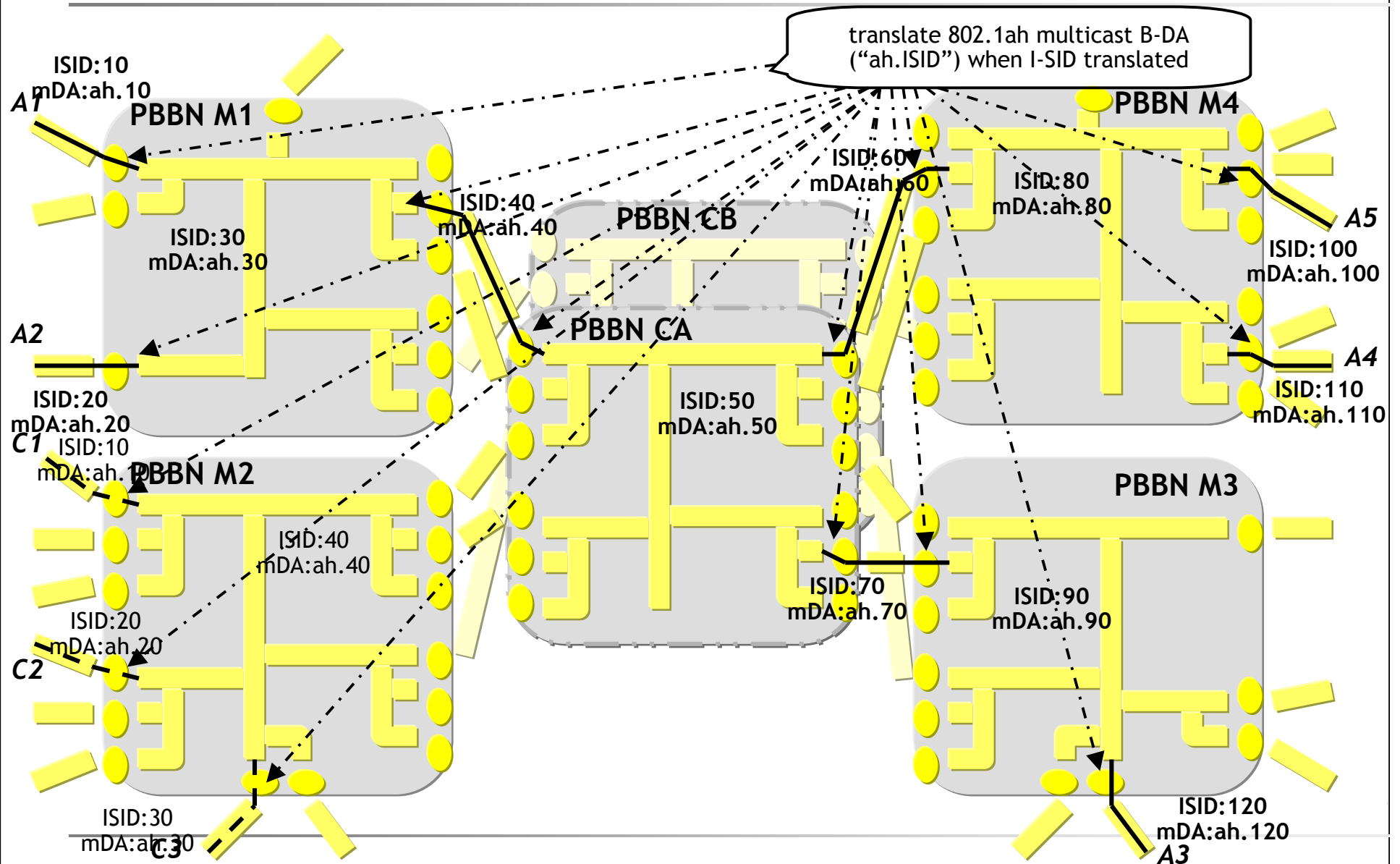


# PBB mp intra-/inter-metro services

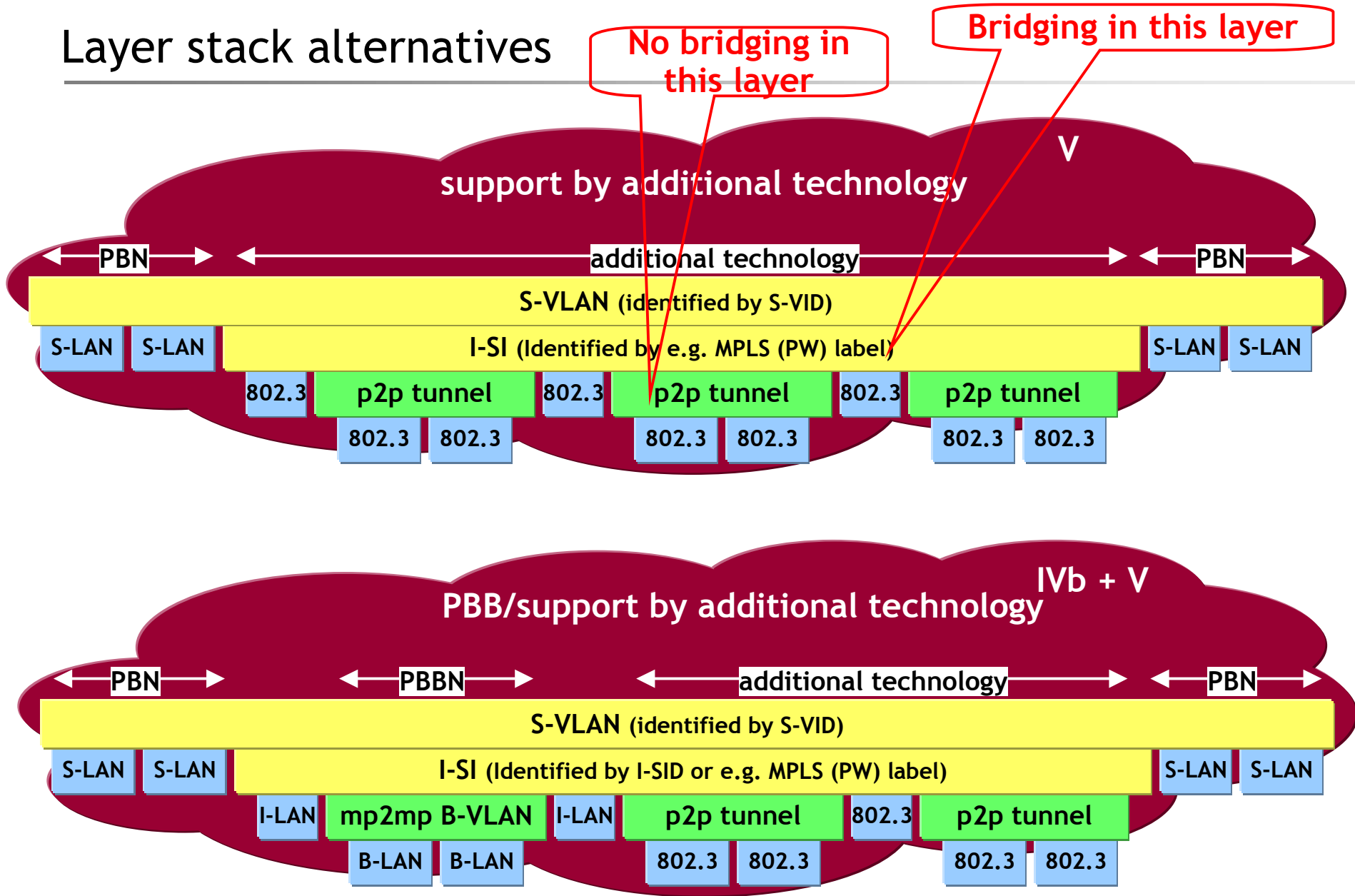
## Model IVb



# PBB mp intra-/inter-metro services Model IVb



# Layer stack alternatives



# mp intra-/inter-metro services support by additional technology

## *tree-structured n-port service instance*

